The Groupon Effect on Yelp Ratings: A Root Cause Analysis
John Byers (BU), Michael Mitzenmacher (Harvard), Giorgos Zervas (Yale)
Multi-billion dollar local e-commerce marketplace.
Connects consumers to merchants by offering discounted products and services.
Groupon? “Never heard of it.”

<table>
<thead>
<tr>
<th>Consumers</th>
<th>Groupon</th>
<th>Merchants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discounts via coupons</td>
<td>~50% of coupon value</td>
<td>New, valuable customers</td>
</tr>
</tbody>
</table>
Groupon? “Never heard of it.”

**Revenue growth**

- **2008**: $0Bn
- **2009**: $1Bn
- **2010**: $3Bn
- **2011**: $3Bn
- **2012**: $3Bn

**Subscriber growth**

- **2008**: 0M
- **2009**: 125M
- **2010**: 250M
- **2011**: 250M
- **2012**: 250M

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**South Bay Sailing – Redondo Beach**

$65 for Hour of Sailing for Up to Four ($135 Value)

> **Value**: $135
> **Discount**: 52%
> **You Save**: $70

The deal is on! Tipped at 7:20AM with 25 bought. 267 bought. Limited quantity available.

**The Fine Print**

Expires Jun 16, 2012. Limit 3 per visit. Must reserve by 5/16/12. 2-week cancellation notice or fee up to Groupon price may apply. Subject to weather. Must sign waiver. Valid only from item to sunrise. Children must be able to fit into life vest. See the rules that apply to all deals.

**Highlights**

- Sail aboard a 26' J/80 boat
- Learn sailing basics
- Certified instructors
- No experience needed
Groupon? “Never heard of it.”

Approximately 2,000 daily deal publishers [Daily Deal Media]
Groupon? “Never heard of it.”

Approximately 10,000 daily deal publishers [Daily Deal Media]
Groupon? “Never heard of it.”

Approximately 10,000 daily deal publishers [Daily Deal Media]

798 Daily Deal Sites Folded In The Last 6 Months Of 2011
Groupon? “Never heard of it.”

How do we reconcile these divergent opinions? What can we learn about the viability of the business model?

How do promotional pricing strategies affect reputation?
Anecdotal evidence: JCP, Amazon
Groupon? “Never heard of it.”

How do we reconcile these divergent opinions? What can we learn about the viability of the business model?

How do promotional pricing strategies affect reputation? Anecdotal evidence: JCP, Amazon

Consumers use Yelp to talk about their experiences with Groupon merchants.
Cha Cha Cha

4.5 ★’s on YELP!!

Come in... We're Open
From Cha Cha Cha’s website: “Our classic, trendy or avant-garde colors start with the consult...we listen to you”. I find that nothing could have been further from the truth.

I usually get my hair cut at Supercuts because I have easy hair. Stick straight and style it. I usually get one long layer and done. For my friend's upcoming wedding, I wanted to get a more professional cut to make my hair look extra nice.

I was early for my 5:30 appointment, but Isabel was 20 minutes late. She was late and I explained that I don't like to style my hair and I only wanted inches off. I also explained that I hate when my hair is all one length because I am heavy. A few minutes later I had lost 4 inches, all at one length, and was snipped with a round brush. Isabel was very rough with the brush even after I told her to be more careful. After my hair was dry she snipped a couple of pieces in the front and I would have asked her to layer a little more, but I was afraid of losing any hair to the stylist at the wedding not being able to work with it.

I am really disappointed that all those months of growing my hair out were for nothing. I will have to get another haircut as soon as the wedding is over so I don't have a blanket on my head.
Yelp drives merchant traffic
Merchants with higher ratings get more visibility, 100M views/month

Most local businesses in major cities are on Yelp
30M reviews, 700K local businesses, businesses cannot opt-out

Yelp ratings affect merchant revenues
1-star increase leads to 9% increased revenue [Luca’11], and half-star increase leads to 50% higher chance of sell-out [Anderson & Magruder’11]

Merchants care about Yelp
They care enough to spam it (~15% of all reviews deemed to be fake)

Yelp reviews are forever!
Reviews persist for future potential customers to peruse
Monitored **Jan 3\(^{rd}\) to July 3\(^{rd}\), 2011** in **20** large cities

Collected **16,692** deals

Combination of Groupon API and scraping

Collected approximately **7M** reviews for **1M** merchants

Complete review history of each linked business

Complete review history of each user

Filtered reviews for a subset of businesses (behind CAPTCHAs, used oDesk workers)
How do daily deal coupons affect merchant reputation?

On their website for merchants Groupon claims...

If Groupon’s claims are true, then we expect to see...

- **Increased WOM**
  A surge in the volume of reviews following the Groupon deal.

- **High customer satisfaction**
  A distribution of star ratings, no worse than what is typical for this business.
Measuring the Groupon effect, identification strategy

Merchant A

Merchant B

Merchant C
Measuring the Groupon effect, identification strategy
The Groupon Effect

Review volume, and ratings around Groupon deals

<table>
<thead>
<tr>
<th>Reviews/day</th>
<th>Days before offer</th>
<th>Day Groupon offered</th>
<th>Days after offer</th>
</tr>
</thead>
<tbody>
<tr>
<td>-360</td>
<td>-270</td>
<td>-180</td>
<td>-90</td>
</tr>
<tr>
<td>-360</td>
<td>-270</td>
<td>-180</td>
<td>-90</td>
</tr>
<tr>
<td>-360</td>
<td>-270</td>
<td>-180</td>
<td>-90</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Stars</th>
<th>All reviews</th>
<th>Reviews mentioning Groupon</th>
<th>Avg. daily rating</th>
<th>30-day rolling avg. rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.25</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.50</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.75</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The Groupon Effect

Review volume, and ratings around Groupon deals

Increased WOM: reviews up 60%, half due to Groupon mentions

2-weeks prior: 230/day  2-weeks post: 370/day
The Groupon Effect

Review volume, and ratings around Groupon deals

Consumer satisfaction: ratings down 0.2 stars
2-weeks prior: 3.75 stars  
2-weeks post: 3.55 stars
The Groupon Effect

Review volume, and ratings around Groupon deals

Consumer satisfaction by user type:
Groupon users: **3.27 stars**  Non-Groupon users: **3.73 stars**
The Groupon Effect

Review volume, and ratings around Groupon deals

Most deals carry a six month expiration date
The Groupon Effect

Review volume, and ratings around Groupon deals

Groupon deals have a lasting effect on Yelp ratings
So, why do Yelp ratings decline post-Groupon?

<table>
<thead>
<tr>
<th>Mechanism</th>
<th>Reasoning</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Intrinsic decline</td>
<td>Prior work shows that review scores fall over time [Godes &amp; Silva ’11]</td>
</tr>
<tr>
<td>2. Critical reviewers</td>
<td>Groupon users are more critical than their peers</td>
</tr>
<tr>
<td>3. Bad businesses</td>
<td>The surge of customers overwhelms merchants, unpreparedness</td>
</tr>
<tr>
<td></td>
<td>Businesses actively discriminate against customers with a Groupon</td>
</tr>
<tr>
<td>4. Experimentation</td>
<td>Groupon users are experimenting when using coupons</td>
</tr>
<tr>
<td>5. Artificial reviews</td>
<td>Groupon reviews are actually a more accurate baseline than all reviews</td>
</tr>
</tbody>
</table>

Distinct managerial consequences associated with each mechanism
Groupon review
A review that contains keyword “Groupon”.

Groupon user
A user who has written at least one Groupon review.

Groupon business
A business that ran a Groupon deal.
H1: Ratings suffer an intrinsic decline over time [GS’11]

We verify in our data that, indeed, ratings decline over time.
H2: Groupon businesses are “bad” businesses

Are some businesses unprepared to handle the customer influx?

- We see an immediate surge of reviews following a deal, which suggests a surge of customers the business might be unprepared to handle
- 10% of businesses have since closed, on average within ~1 year after Groupon

![Rating During Groupon – Before Groupon](attachment:image.png)

- N = 4051
- Bandwidth = 0.2
H2: Groupon businesses are “bad” businesses

Do some businesses discriminate against Groupon users?

- A lot of anecdotal evidence on the web

Deal s vary in their terms and conditions

- Approximately 30% ran capped Groupon deals
- Similarly 25% required reservations to use the coupons
How do Groupon users rate non-Groupon businesses? Are they more picky than the average consumer?

But when they use Groupon, their avg. rating is just 3.28 stars. Suggests, Groupon users not much more critical on average.
## Groupon users vs. non-Groupon users

<table>
<thead>
<tr>
<th></th>
<th>Yelping Since</th>
<th>Friends</th>
<th>Fans</th>
<th>Reviews</th>
<th>Firsts</th>
<th>Votes</th>
<th>Review Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Groupon user</td>
<td>06/2009</td>
<td>45</td>
<td>4.4</td>
<td>90</td>
<td>7.2</td>
<td>2.2</td>
<td>1,100</td>
</tr>
<tr>
<td>Non-Groupon user</td>
<td>06/2009</td>
<td>24</td>
<td>1.9</td>
<td>44</td>
<td>3.7</td>
<td>1.0</td>
<td>800</td>
</tr>
</tbody>
</table>

### Groupon users are “mavens” [Gladwell’00]

- They write longer, more critically acclaimed reviews
- They are better connected on the Yelp social network
- They are more often the first to review a business
Does Groupon encourage consumer experimentation?
By experimentation, we mean the degree to which consumers try something new.
Not easy to measure directly, so we use two proxies:

- Do consumers try merchants in new ZIP codes?
- Do consumers try merchants in new categories?

Data

Within each user’s review history, and for each of the user’s reviews, is there another review that user wrote with a matching zip or category?
## Does Groupon encourage consumer experimentation?

<table>
<thead>
<tr>
<th>Probability of experimentation</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Not using Groupon</td>
<td>9%</td>
</tr>
<tr>
<td>Using Groupon</td>
<td>35%</td>
</tr>
</tbody>
</table>

Groupon users are more 4 times more likely to experiment when they use a Groupon.
Correlated random effects probit

\[
\Pr[1\text{-star review} \mid X] = F(X)
\]

\[
\Pr[5\text{-star review} \mid X] = F(X)
\]

Using this model, we can ask questions like...
How does the probability of a 1-star review change with consumer experimentation?
## Marginal probability effects

<table>
<thead>
<tr>
<th>Category</th>
<th>Effect</th>
<th>Positive</th>
<th>Negative</th>
<th>Total Positive</th>
<th>Total Negative</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Intrinsic decline</strong></td>
<td></td>
<td><img src="https://via.placeholder.com/15" alt="5 Stars" /></td>
<td><img src="https://via.placeholder.com/15" alt="4 Stars" /></td>
<td><img src="https://via.placeholder.com/15" alt="3 Stars" /></td>
<td><img src="https://via.placeholder.com/15" alt="2 Stars" /></td>
</tr>
<tr>
<td>Review rank</td>
<td>0.006%</td>
<td>0.002%</td>
<td>-0.003%</td>
<td>-0.002%</td>
<td></td>
</tr>
<tr>
<td>Grumpy Groupon users</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Groupon user</td>
<td>-4%</td>
<td>0.5%</td>
<td>5%</td>
<td>-7%</td>
<td></td>
</tr>
<tr>
<td>“Bad” businesses</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capped deal</td>
<td>2%</td>
<td>0%</td>
<td>-1%</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>Reservation required</td>
<td>2%</td>
<td>1%</td>
<td>0%</td>
<td>-3%</td>
<td></td>
</tr>
<tr>
<td>Consumer experimentation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experimental ZIP</td>
<td>3%</td>
<td>1%</td>
<td>-4%</td>
<td>4%</td>
<td></td>
</tr>
<tr>
<td>Experimental category</td>
<td>4%</td>
<td>-0.5%</td>
<td>-5%</td>
<td>8%</td>
<td></td>
</tr>
<tr>
<td>Reviews during Groupon</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Groupon mention</td>
<td>6%</td>
<td>4%</td>
<td>-2%</td>
<td>-6%</td>
<td></td>
</tr>
<tr>
<td>No Groupon mention</td>
<td>2%</td>
<td>1%</td>
<td>-1%</td>
<td>-2%</td>
<td></td>
</tr>
</tbody>
</table>
Fake reviews, or, was the baseline artificially high?

Yelp algorithmically filters “fake, shill, or malicious reviews”. Maybe Groupon users are more likely to be legitimate.

<table>
<thead>
<tr>
<th></th>
<th>Pct. filtered</th>
<th>Avg. rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Groupon users</td>
<td>15%</td>
<td>3.8 stars</td>
</tr>
<tr>
<td>Non-Groupon users</td>
<td>11%</td>
<td>3.6 stars</td>
</tr>
</tbody>
</table>

Reviews by Groupon users are ~30% less likely to be filtered.

Groupon to likely deflate manipulated Yelp ratings.
Take aways

- Powerful insights by linking disparate data sources
- Groupon users are potentially desirable customers: not especially harsh reviewers, and well-connected online
- Groupon not well suited to businesses with limited capacity
- Decision to run Groupon should account for current Yelp rating
- Groupon has to break the link with bad Yelp ratings; consumers’ ratings are sensitive to unfamiliar products
Maximizing growth likely the wrong strategy for Groupon

- Business model too easy to replicate, no network externalities
- Provides wrong incentives for Groupon salespeople
- Focus on attracting quality consumers and businesses instead
  (Smaller discounts? Better personalization? Help merchants prepare?)

Thanks!


@gzervas